PATENT CLAIMS

1. A coating composition comprising particles of a polyolefin wax or of a mixture of polyolefin waxes suspended in a liquid phase.

2. The coating composition according to claim 1 wherein the liquid phase of the coating composition has a boiling point or a boiling point range lower than the melting point or melting point range of the particles of the polyolefin wax or of the mixture of polyolefin waxes.

3. The coating composition according to any of claims 1 to 2 wherein the liquid phase of the coating composition is organic.

4. The coating composition according to any of the above claims wherein the liquid phase of the coating composition consists essentially of a member of the group consisting of ethers, esters, ketones, alcohols and mixtures thereof.

5. The coating composition according to any of the above claims wherein the liquid phase of the coating composition comprises an alcohol, preferably ethyl alcohol.

6. The coating composition according to claim 5 wherein the liquid phase of the coating composition comprises an alcohol, preferably ethyl alcohol, and water

7. The coating composition according to claim 6 wherein the concentration of water, calculated on weight basis, in the liquid phase is up to 50 %.

8. The coating composition according to any of claims 1 to 2 wherein the liquid phase of the coating composition is essentially aqueous.

9. The coating composition according to any of the above claims wherein the coating composition, calculated on weight basis, contains:

- polyolefin wax/mixture of polyolefin waxes 1 - 25 %, preferably 9 - 13 %, -
- liquid phase 99 - 75 %, preferably 91 - 87 %.

10. The coating composition according to any of the above claims wherein the coating composition comprises one or more auxiliary agents selected from the group consisting of diluting agents, dispersing agents, conservation agents, emulsifying agents, and colouring agents.

11. The coating composition according to claim 10 wherein the coating composition, calculated on weight basis, contains up to 10% auxiliary agents.

12. The coating composition according to any of the above claims wherein the coating composition is consisting essentially of particles of a polyolefin wax or of a mixture of polyolefin waxes suspended in a liquid phase.

13. The coating composition according to any of the above claims wherein the coating composition is consisting essentially of particles of a polyolefin wax or of a mixture of polyolefin waxes suspended in a liquid organic or aqueous phase and one or more auxiliary agents selected from the group consisting of diluting agents, dispersing agents, conservation agents, emulsifying agents, and colouring agents.

14. The coating composition according to any of the above claims wherein the polyolefin wax or the components in the mixture of polyolefin waxes suspended in the coating composition are selected from the group consisting of polyethylene waxes, polypropylene waxes and oxidized and/or

halogenated, in particular fluorinated polyethylene and polypropylene waxes.

15. The coating composition according to any of the above claims wherein the polyolefin wax or the components in the mixture of polyolefin waxes suspended in the coating composition is having a degree of polymerisation between 8 and 100, in particular between 20 and 80.

16. The coating composition according to claims 14 to 15 wherein the polyolefin wax or the components in the mixture of polyolefin waxes suspended in the coating composition is an oxidised polyethylene wax.

17. The coating composition according to claim 16 wherein the oxidised polyethylene wax has an acid number in the interval of 1 to 100 mg KOH/g, preferably in the interval of 1 to 40 mg KOH/g, more preferably in the interval of 1 to 30 mg KOH/g, even more preferably in the interval of 2 to 20 mg KOH/g, yet more preferably in the interval of 2 to 10 mg KOH/g.

18. The coating composition according to any of the above claims wherein the polyolefin wax or one of the components in the mixture of polyolefin waxes suspended in the coating composition is a polyethylene wax.

19. The coating composition according to any of the above claims wherein the polyolefin wax is essentially a polyethylene wax.

20. The coating composition according to any of claims 14 to 19 wherein the particle size of the polyethylene wax is between 0.1 and 100 μm, preferably between 2 and 25 μm, in particular between 4 and 20μm.

21. The coating composition according to any of claims 14 to 20 wherein the melting point of the polyethylene wax is between 70 and 200°C, preferably between 90 and 150°C, in particular between 90 and 120°C.

22. The coating composition according to any of claims 14 to 21 wherein the peak melting point of the polyethylene wax is between 70 and 145°C, preferably between 80 and 140°C, in particular between 90 and 135°C, in particular between 95 and 120°C.

23. The coating composition according to any of claims 14 to 22 wherein the polyethylene wax is having a degree of polymerisation between 10 and 3000, in particular between 10 and 2000, in particular between 10 and 1000, in particular between 10 and 500, in particular between 20 and 300, in particular between 30 and 200, in particular between 40 and 150, in particular between 40 and 100.

24. The coating composition according to any of claims 14 to 22 wherein the polyethylene wax is having a degree of polymerisation between 50 and 3000, in particular between 50 and 1500, in particular between 60 and 1000.

25. The coating composition according to any of claims 14 to 24 wherein the polyethylene wax is consisting of essentially linear polyethylene.

26. The coating composition according to any of claims 14 to 25 wherein the polyethylene wax is a high-density polyethylene, HDPE.

27. The coating composition according to any of claims 14 to 26 wherein the polyethylene wax has a viscosity at 149 °C of 2000 mPa s or less, 1000 mPa s or less, of 300 mPa s or less, preferably 200 mPa s or less,

preferably 150 mPa s or less, preferably 100 mPa s or less, preferably 70 mPa s or less, preferably 50 mPa s or less, preferably 40 mPa s or less.

28. The coating composition according to any of claims 14 to 27 wherein the polyethylene wax has a molecular weight distribution, M_W/M_n, of 1 to 25, preferably of 1 to 10, preferably of 1 to 5, preferably of 1 to 3, preferably of 1 to 2, preferably of 1 to 1.5, preferably of 1 to 1.2.

29. The coating composition according to any of claims 14 to 28 wherein the polyethylene wax has a molecular weight M_n in the interval of 400 to 3500 and a molecular weight distribution, M_W/M_n, of 6,0 or less, preferably has a molecular weight M_n in the interval of 400 to 3500 and a molecular weight distribution, M_W/M_n, of 4,0 or less, more preferably has a molecular weight M_n in the interval of 400 to 3500 and a molecular weight distribution, M_W/M_n, of 2,0 or less.

30. The coating composition according to any of claims 14 to 15 wherein the polyolefin wax or one of the components in the mixture of polyolefin waxes suspended in the coating composition is a polypropylene wax.

31. The coating composition according to any of claims 14 to 15 wherein the polyolefin wax is essentially a polypropylene wax.

32. The coating composition according to any of claims 14 to 15 wherein one of the components in the mixture of polyolefin waxes suspended in the coating composition is a co-polymer of propylene and one or more other olefins.

33. The coating composition according to any of claims 14 to 15, 30 to 32 wherein the particle size of the polypropylene wax is between 0.1 and 100 μm, preferably between 2 and 25 μm, in particular between 4 and 20μm.

34. The coating composition according to any of claims 14 to 15, 30 to 33 wherein the melting point of the polypropylene wax is between 70 and 250°C, preferably between 100 and 180°C, in particular between 100 and 140°C.

35. The coating composition according to any of claims 14 to 15, 30 to 34 wherein the peak melting point of the polypropylene wax is between 70 and 200°C, preferably between 100 and 170°C, in particular between 110 and 160°C, in particular between 120 and 150°C.

36. The coating composition according to any of claims 14 to 15, 30 to 35 wherein the polypropylene wax is consisting of essentially unbranched polypropylene molecules.

37. The coating composition according to any of claims 14 to 15, 30 to 36 wherein the polypropylene wax is characterised as consisting of essentially isotactic polypropylene molecules.

38. The coating composition according to any of claims 14 to 15, 30 to 36 wherein the polypropylene wax is characterised as consisting of essentially syndiotactic polypropylene molecules.

39. The coating composition according to any of claims 14 to 15, 30 to 36 wherein the polypropylene wax is characterised as consisting of essentially stereo block polymer structures, i.e. molecules having segments being syndiotactic or isotactic.

40. The coating composition according to any of claims 14 to 15, 30 to 39 wherein the polypropylene wax has a viscosity at 190 °C of 400 mPa s or less, preferably 200 mPa s or less, preferably 150 mPa s or less, preferably

100 mPa s or less, preferably 70 mPa s or less, preferably 50 mPa s or less, preferably 40 mPa s or less.

41. The coating composition according to any of claims 14 to 15, 30 to 40 wherein the polypropylene wax has a melt flow at 230 °C/2.16 kg of 40 g/min or more, preferably 100 g/min or more, preferably 500 g/min or more, preferably 1000 g/min or more, preferably 4000 g/min or more, preferably 8000 g/min or more.

42. The coating composition according to any of claims 14 to 15, 30 to 41 wherein the polypropylene wax has a molecular weight distribution, M_W/M_n, of between 1 and 25, preferably of between 1 and 10, preferably of between 1 and 5, preferably of between 1 and 3, preferably of between 1 and 2, preferably of between 1 and 1.5, preferably of between 1 and 1.2.

43. The coating composition according to any of claims 14 to 15 wherein the polyolefin wax or one of the components in the mixture of polyolefin waxes suspended in the coating composition is a polytetrafluorethylene wax.

44. The coating composition according to claim 43 wherein the particle size of the polytetrafluorethylene wax is between 0.1 and 100 μm, preferably between 2 and 25 μm, in particular between 4 and 20μm.

45. The coating composition according to any of claims 43 to 44 wherein the melting point of the polytetrafluorethylene wax is between 250 and 360°C, preferably between 260 and 330°C, in particular between 280 and 320°C.

46. The coating composition according to any of claims 1 to 13 wherein the polyolefin wax or the components in the mixture of polyolefin waxes

suspended in the coating composition consists essentially of one or more of the alkanes selected from the group of alkanes determined by the generic formula CH_3CHR_1-$(CH_2CHR_1)_n$-CHR_1-CH_3 for n equal to:
15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, where R_1 = H or CH_3.

47. The coating composition according to any of claims 1 to 13 wherein the polyolefin wax or the components in the mixture of polyolefin waxes suspended in the coating composition consists essentially of one or more of the alkanes selected from the group of alkanes determined by the generic formula CH_3CHR_1-$(CH_2CHR_1)_n$-CHR_1-CH_3 for n equal to:
49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, where R_1 = H or CH_3.

48. The coating composition according to any of claims 46 or 47 wherein the alkanes has a number of alkyl groups situated on the carbon backbone of the alkanes as branches, which number is 30 or less, preferably 20 or less, more preferably 10 or less, even more preferably 5 or less.

49. The coating composition according to claim 48 wherein the alkyl groups situated on the carbon backbone of the alkane are selected from the group consisting of methyl, ethyl, propyl, butyl, pentyl, hexyl, heptyl, octyl, preferably from the group consisting of ethyl, butyl, hexyl, octyl, more preferably from the group consisting of ethyl and butyl, yet more preferably is ethyl.

50. The coating composition according to claim 46 or 47 wherein $R_1 = CH_3$ and all the methyl groups have the same stereochemistry.

51. The coating composition according to claim 46 or 47 wherein $R_1 = CH_3$ and the stereochemistry changes from one methyl group to a neighbouring other methyl group.

52. The coating composition according to claim 46 or 47 wherein $R_1 = CH_3$ and the molecular structure is a stereo block.

53. A method of treating a surface comprising the steps of

- providing a coating composition according to any of claims 1 to 52

- applying said coating composition to the surface;

- evaporating said liquid phase from the applied coating composition; and

- subjecting said dried, applied coating composition to a heating treatment to coalesce said wax particles.

54. A method of providing a surface with a protecting coating by

- applying a coating composition according to any of claims 1 to 52 to the surface;

- evaporating said liquid phase from the applied coating composition;

- subjecting said dried, applied coating composition to a heating treatment to raise the temperature of the dried coating composition to bring said particles of a polyolefin wax or of a mixture of polyolefin waxes into a coalescing state allowing said wax particles to provide a continuous coating of the surface; and

allowing said heat treated coating composition to consolidate to a protective coating.

55. The method according to any of claims 53 to 54 wherein the coating composition is applied to the surface by spraying.

56. The method according to any of claims 53 to 55 wherein the coating composition is applied to the surface in an amount of 50 to 350 ml per m^2.

57. Use of the coating composition according to any of claims 1 to 52 for treating a surface.

58. Use of the coating composition according to any of claims 1 to 52 for providing a surface with an essentially permanent anti-graffiti coating.

59. Use of the coating composition according to any of claims 1 to 52 for providing a surface with an essentially permanent coating protecting against pollution and corrosion.

60. Use of the coating composition according to any of claims 1 to 52 for providing an under water structure, e.g. a ship hull, with an essentially permanent anti-fouling coating.

61. An article of manufacture comprising a structure with a surface obtainable by the method according to any of claims 53 to 56.

62. An article of manufacture comprising a structure with a surface obtainable by use of the coating composition according to any of claims 1 to 52.

63. A method of treating a sheet comprising the steps of
- providing a coating composition according to any of claims 1 to 52;
- applying said coating composition to at least one surface of the sheet;
- evaporating said liquid phase from the applied coating composition; and
- subjecting said dried, applied coating composition to a heating treatment to coalesce said wax particles.

64. A method of producing a coated sheet comprising the steps of
- applying a coating composition according to any of claims 1 to 52 to at least one surface of the sheet;
- evaporating said liquid phase from the applied coating composition;
- subjecting said dried, applied coating composition to a heating treatment to raise the temperature of the dried coating composition to bring said particles of a polyolefin wax or of a mixture of polyolefin waxes into a coalescing state allowing said wax particles to provide a continuous coating of the sheet; and

allowing said heat treated coating composition to consolidate to a protective coating.

65. A method according to any of claims 63 to 64, wherein the sheet is a film.

66. A method according to any of claims 63 to 64, wherein the sheet 1 is comprising an adhesive layer 2 having a first major adhesive layer side and a second major adhesive layer side which defines the bottom surface of the sheet and a film 3 having a first major film side 4 and a second major film side, said second major film side being bonded to the first major adhesive layer side; and the coating composition being applied to said first major film side 4.

67. A method according to any of claims 63 to 64, wherein the sheet 101 is comprising an adhesive layer 102 having a first major adhesive layer side and a second major adhesive layer side which defines the bottom surface of the sheet and two or more films 103 each having a first major film side and a second major film side; and each film is stacked upon another film such that a second major film side of a film above is bonded to a first major film side of a film below except the lowest film in the stacked which has its second major film side bonded to the first major adhesive layer side; and the topmost film side 104 is subjected to said method of coating.

68. A method according to any of claims 63 to 64, wherein the sheet 201 is comprising two or more pairs of layers 205, each pair of layers 205 comprising an adhesive layer 202 having a first major adhesive layer side and a second major adhesive layer side, and a film 203 having a first major film side and a second major film side with the second major film side being bonded to the first major adhesive layer side; and

each pair of layers 205 is stacked upon another pair of layers 205 such that a second major adhesive layer side of a pair above is bonded to a first major film side of a pair of layers 205 below; and
the topmost film side 204 is subjected to said method of coating.

69. A method according to any of claims 63 to 64 wherein the sheet comprises one film with a first major film side and a second major film side; and the first major film side and the second major film side are subjected to said coating method.

70. A method according to any of claims 63 to 69 wherein the film further comprises one or more of the applicable substances selected from the group of laquer, overprint clear, clearcoat or backing, and combinations thereof, applied to a major film side.

71. A method according to any of claims 63 to 70 wherein the sheet has a thickness of between 20 microns and 8000 microns, preferably between 30 microns and 5000 microns, more preferably between 30 microns and 2000 microns, even more preferably between 30 microns and 500 microns.

72. A method according to any of claims 63 to 71 wherein the film has a thickness of between 20 microns and 4000 microns, preferably between 20 microns and 2000 microns, more preferably between 20 microns and 500 microns, even more preferably between 20 microns and 250 microns.

73. An article comprising a sheet treated by the method of any of claims 63 to 72.

74. An article according to claim 73 further comprising a liner bonded to a major sheet surface.

allowing said heat treated coating composition to consolidate to a protective coating.

82. A method according to claim 81, wherein the sheet is consisting of a film.

83. A method according to claim 81, wherein the sheet 1 is comprising an adhesive layer 2 having a first major adhesive layer side and a second major adhesive layer side which defines the bottom surface of the sheet and a film 3 having a first major film side 4 and a second major film side, said second major film side being bonded to the first major adhesive layer side; and the coating composition being applied to said first major film side 4.

84. A method according to claim 81, wherein the sheet 101 is comprising an adhesive layer 102 having a first major adhesive layer side and a second major adhesive layer side which defines the bottom surface of the sheet and two or more films 103 each having a first major film side and a second major film side; and each film is stacked upon another film such that a second major film side of a film above is bonded to a first major film side of a film below except the lowest film in the stacked which has its second major film bonded to the first major adhesive layer side; and the topmost film side 104 is subjected to said method of coating.

85. A method according to claim 81, wherein the sheet 201 is comprising two or more pairs of layers 205, each pair of layers 205 comprising

an adhesive layer 202 having a first major adhesive layer side and a second major adhesive layer side, and

a film 203 having a first major film side and a second major film side

with the second major film side being bonded to the first major adhesive layer side; and

each pair of layers 205 is stacked upon another pair of layers 205 such that a second major adhesive layer side of a pair above is bonded to a first major film side of a pair of layers 205 below; and

the topmost film side 204 is subjected to said method of coating.

86. A method according to any of claims 81 to 85 wherein the film further comprises one or more of the applicable substances selected from the group of laquer, overprint clear, clearcoat or backing, and combinations thereof, applied to a major film side.

87. A method according to any of claims 81 to 86 wherein the sheet has a thickness of between 20 microns and 8000 microns, preferably between 30 microns and 5000 microns, more preferably between 30 microns and 2000 microns, even more preferably between 30 microns and 500 microns.

88. A method according to any of claims 81 to 87 wherein the film has a thickness of between 20 microns and 4000 microns, preferably between 20 microns and 2000 microns, more preferably between 20 microns and 500 microns, even more preferably between 20 microns and 250 microns.

89. A structure which has been applied with the method of any of claims 81 to 88, wherein the structure is selected from the group consisting of buildings, parts of buildings, elevators, windows, doors, tiles, walls, partitions, furniture, signs, bill boards, artwork, vehicles.

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